

HELLENIC INSTITUTION OF PACKAGING

**TEST REPORT**

<b>REPORT NUMBER: 10-103/01/01</b>		<b>CLIENT</b>  <b>MARIS POLYMERS</b> 23 Konstantinoupoleos street 15236 Nea Pendeli, Attica Tel.: + 030 1 8254105, 8045011 Fax: + 30 1 8045011, (0262) 32918
<b>REPORT DATE: 03/08/01</b>		
<b>ITEMS TESTED:</b> (Precise description, sampling procedure) • POLYURETHANE FILM, <b>MARISEAL 250</b>		
<b>TEST ITEMS RECEIVED ON: 13/7/2001</b>		
<b>DATES OF TESTING: 19/7/01 – 03/8/01</b>		
<b>TEST PERFORMED</b> (Include Special Arrangements):		Measurement of the permeability (Water Vapor Transmission Rate) of the plastic films to water vapors according to the international standard ISO 9932:91
<b>TEST EQUIPMENT:</b>	A) TNO / Pira Direct Reading WVTR B) Sample acclimatizing chamber Heraeus HC 0057, serial No. S.3543	
<b>REPORT:</b>		
<ul style="list-style-type: none"> <li>The samples were cut in dimensions 10 x 10 cm, pre acclimatized for 24 hours under temperature of 30°C and 50% rh (relative humidity) and acclimatized for 24 hours under temperature of 23°C and 50% r.h.</li> <li>The operation principle is based on the following concepts: water (in the form of vapors) enters the element (electrode) by penetration through the sample being examined and then it is destroyed by electrolysis. The indication of the intensity of the current on the element (electrode) constitutes a direct measurement of the velocity of degradation of the water.</li> <li>The procedure followed is as follows: The electrodes to be used are flushed and then dried. Then the sample is placed and then follows the equilibrium of the interior environment created with the external so that the water is decomposed in the same velocity by which it is introduced into the element. Under these conditions, the current of the element is proportional to the WVTR of the sample.</li> <li>The face under examination is placed in such a way that it is contact with an environment of high humidity. This environment is under temperature conditions of 25°C and relative humidity 75 R.H.</li> </ul>		
<b>WATER VAPOUR TRANSMISSION RATE (WVTR):</b> The calculated mass of vapors that are passing through the defined surface unit, at a defined time, under strictly defined conditions of temperature and relative humidity. It is expressed in grams (g) per square meter (m <sup>2</sup> ) per 24 hours = 1 day [g/m <sup>2</sup> d]		
	<b>Side A</b>	<b>Side B</b>
<b>S/N</b>	<b>WVTR [g/m<sup>2</sup> d]</b>	<b>WVTR [g/m<sup>2</sup> d]</b>
1	23,0	-
2	21,0	-
3	30,0	-
4	29,0	-
	Mean value: 25,8 Standard deviation: 4,4	Mean value: - Standard deviation: -

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G.P.I. QUALITY ASSURANCE

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 Offices abroad: ALEXANDRIA, ANTWERP, ODESSA, PARIS



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**REMARKS:**

- The specific test is not included in the range of certification of the G.P.I.
- The specific laboratory test has been included in an inter-laboratory control project.
- In the specific test, one facet (A) of the material was randomly tested.
- During the experimental procedure it was found that the maximum WVTR that the instrument can measure is small in relation to the WVTR value expected from the material under examination. To deal with this problem a mask was used (impermeable, multi-layered films that have a hole in their middle) and this way the available surface of the sample is reduced. With this method the final indication of the instrument is multiplied by a factor illustrating how many times has the initial available surface of the sample has been reduced (for the particular test the factor is 10).

TEST RESULTS REFER ONLY TO SAMPLES TESTED. THIS DOCUMENT DOES NOT CONSTITUTE PRODUCT APPROVAL

SIGNATURE OF TESTING OFFICER	SIGNATURE OF TECHNICAL DIRECTOR	SIGNATURE OF G.P.I. DIRECTOR
 (Signature) K. SIAFARIKAS	a.l.  (Signature) M. DANIHL	a.l.  (Signature) GIORGOS PARTSILIVAS DIRECTOR

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10-103/01/01

**HELLENIC INSTITUTION OF PACKAGING**
**TEST REPORT**

<b>REPORT NUMBER:</b> 10-103/01/03		<b>CLIENT</b>	
<b>REPORT DATE:</b> 27/07/01		<b>MARIS POLYMERS</b> 23 Konstantinoupoleos street 15236 Nea Pendeli, Attica Tel.: + 030 1 8254105, 8045011 Fax: + 30 1 8045011, (0262) 32918	
<b>ITEMS TESTED:</b> (Precise description, sampling procedure) • Polyurethane Film, <b>MARISEAL 250</b>			
<b>TEST ITEMS RECEIVED ON:</b> 17/07/01			
<b>DATES OF TESTING:</b> 24/07/01			
<b>TEST PERFORMED</b> (Include Special Arrangements): <p style="text-align: center;"><b>Elasticity</b> (percentage of elongation during tensile stress) according to <b>ASTM D 412-98a</b></p>			
<b>TEST EQUIPMENT:</b> <ul style="list-style-type: none"> <li>(a) Hounsfield H10KM, serial No: 453</li> <li>(b) Wallace Press, serial No: C 93036/8</li> <li>(c) Standard die ASTM D 412-C, serial No: 382116-60</li> <li>(d) Dial gauge Lorentzen, serial No: 6223</li> <li>(e) Heraeus type HC 0057, serial No: 46089</li> </ul>			
<b>REPORT:</b> <ul style="list-style-type: none"> <li>• From one sample of the material of surface area 1 m x 1 m, without any surface marks there were fifteen (15) samples cut out using instruments (b) and (c), in the shape of "dumbbell", in the dimensions of matrix C as defined in the standard pg. 43, with a total length 115 mm and sample width of 6 mm.</li> <li>• The samples were placed for 60 hours in the climate chamber (e), in order to acclimatized under temperature conditions of 23°C and relative humidity (r.h.) 50%.</li> <li>• The test was performed under laboratory conditions (23°C and 50% RH).</li> <li>• Initially, the thickness of each sample was measured with instrument (d) at three points of the sample (ends and middle) and its average/mean value resulted.</li> <li>• The length of the samples that were subjected to tensile stress was 7 cm and it involved one direction of the material.</li> <li>• The speed of the tensile stress (elongation rate) was 500 mm/min.</li> <li>• Six (6) samples were tested in one direction. From these, the samples that failed were rejected. Finally, 10 values of the elasticity of the samples were recorded.</li> <li>• The table below lists the elasticity results for each sample.</li> </ul>			
<b>S/N</b>	<b>Elasticity (%)</b>	<b>S/N</b>	<b>Elasticity</b>
1	988,00	1	924,85
2	986,80	2	898,45
3	876,05	3	762,20
4	864,00	4	852,95
5	950,80	5	841,75

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**Mean Value: 894,26%, Standard Deviation: 70,30%**

Therefore, **Elasticity: (894,26 ± 22,25)%**

**REMARKS:**

- The specific test is not included in the range of certification of the G.P.I.
- The uncertainty written is based on standard uncertainty multiplied by the coverage factor  $k = 2$  which provides a level of confidence of approximately 95%.
- Elasticity is defined as the percentage of elongation of the sample, during its tensile stress, until it breaks (see pg. 45 of standard, ultimate elongation).

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 (signature) <b>K. SIAFARIKAS</b>	a/a  (signature) <b>M. DANIHL</b>	a/a  (Signature) <b>GIORGOS PARTSILIVAS DIRECTOR</b>

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